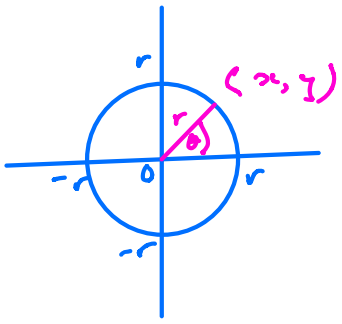
Circle centre $(0,0)$ radius r

$$x = r\cos\theta$$
$$y = r\sin\theta$$

for $0 \le \theta < 2\pi$

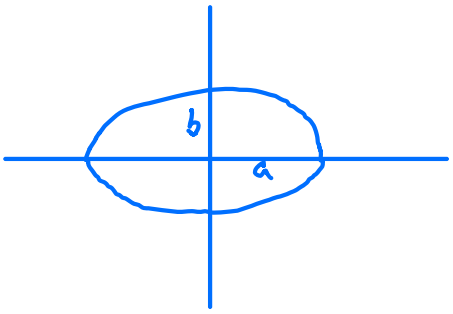


Find cartesian eqn

$$x^2 = r^2\cos^2\theta$$
$$y^2 = r^2\sin^2\theta$$
$$x^2 + y^2 = r^2(\cos^2\theta + \sin^2\theta)$$
$$x^2 + y^2 = r^2$$

Ex 2 Ellipse

$$x = a\cos\theta$$
$$y = b\sin\theta$$



Find cartesian eqn

$$\frac{x}{a} = \cos\theta$$

$$\frac{y}{b} = \sin\theta$$

$$\frac{x^2}{a^2} = \cos^2\theta$$

$$\frac{y^2}{b^2} = \sin^2\theta$$

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = \cos^2\theta + \sin^2\theta$$

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$$

Ex 3 Parabola $x = at^2$

$y = 2at$

Ex 8B Q 7

$x = 3\cot^2 2t$ $\quad$ $y = 3\sin^2 2t$

$\frac{x}{3} = \cot^2 2t$ $\quad$ $\frac{y}{3} = \sin^2 2t$

$$1 + \cot^2 2t = \operatorname{cosec}^2 2t = \frac{1}{\sin^2 2t}$$

$$1 + \frac{x}{3} = \frac{1}{\frac{y}{3}}$$

$$1 + \frac{x}{3} = \frac{3}{y}$$

$$\frac{3+x}{3} = \frac{3}{y}$$

$$\frac{y}{3} = \frac{3}{3+x}$$

$$y = \frac{9}{3+x}$$

$$0 < t \leq \frac{\pi}{4}$$

$$x = 3\cot^2 2t$$

$$t = 0 \quad x = \frac{3\cos^2 2{,}0}{\sin^2(2*0)} \to \infty$$

$$t = \frac{\pi}{4} \quad x = \frac{3\cos^2 \frac{\pi}{2}}{\sin^2 \frac{\pi}{2}} = 0$$

Domain $\underline{x > 0}$